What Is Claimed Is:

1. A method for manufacturing a piezoelectric device, in which a bottom electrode is formed on a substrate, a piezoelectric film is formed on top of said bottom electrode by an ion beam assist method, and a top electrode is formed on top of said piezoelectric film.

2. A method for manufacturing a piezoelectric device, comprising the steps of:

forming a bottom electrode on a substrate;

forming a piezoelectric film on top of said bottom electrode by performing a process in which a sol containing the material of the piezoelectric film is applied as a coating, dried and degreased to form a precursor, and [this precursor] is then fired; and

forming a top electrode on top of said piezoelectric film;

wherein said precursor is irradiated with an ion beam at least once following said degreasing in said step of forming said piezoelectric film.

3. The method for manufacturing a piezoelectric device according to claim 2, wherein said piezoelectric film is formed by repeating a multiple number of times a process in which a sol is applied as a coating, dried and degreased to form a precursor, and [this precursor] is then fired, and said irradiation with an ion beam is performed in a single process of said processes.

4. The method for manufacturing a piezoelectric device according to claim 2 or claim 3, wherein said irradiation with an ion beam is performed after said degreasing and before said firing.

5. The method for manufacturing a piezoelectric device according to claim 2 or claim 3, wherein said irradiation with an ion beam is performed during said firing.

6. The method for manufacturing a piezoelectric device according to any one of claims 1 through 5, wherein said piezoelectric film is formed by PZT, BST or a relaxer material.

7. The method for manufacturing a piezoelectric device according to any one of claims 1 through 5, wherein said piezoelectric film contains a solid solution of PMN_y-PZT_{1-y} consisting of a relaxer material PMN comprising any of the compounds $Pb(M_{1/3}N_{2/3})O_3$ (M = Mg, Zn, Co, Ni, Mn; N = Nb, Ta), $Pb(M_{1/2}N_{1/2})O_3$ (M = Sc, Fe, In, Yb, Ho, Lu; N = Nb, Ta), $Pb(M_{1/2}N_{1/2})O_3$ (M = Mg, Cd, Mn, Co; N = W, Re) or $Pb(M_{2/3}N_{1/3})O_3$ (M = Mn, Fe; N = W, Re) or mixed phases of these compounds, and $Pb(Zr_xTi_{1-x})O_3$ (PZT, $0.0 \leq x \leq 1.0$), and is oriented in any of the orientations of a cubic crystal (100), tetragonal crystal (001), rhombohedral crystal (100) or quasi-cubic crystal (100).

8. A method for manufacturing a piezoelectric device in which a bottom electrode is formed on a substrate by an ion beam assist method, a piezoelectric film is formed on top of said bottom electrode, and a top electrode is formed on top of said piezoelectric film.

9. The method for manufacturing a piezoelectric device according to claim 8, wherein said piezoelectric film is formed on top of said bottom electrode by epitaxial growth.

10. The method for manufacturing a piezoelectric device according to claim 8 or claim 9, wherein said piezoelectric film contains a solid solution of PMN_y-PZT_{1-y} consisting of a relaxer material PMN comprising any of the compounds $Pb(M_{1/3}N_{2/3})O_3$ (M = Mg, Zn, Co, Ni, Mn; N = Nb, Ta), $Pb(M_{1/2}N_{1/2})O_3$ (M = Sc, Fe, In, Yb, Ho, Lu; N = Nb, Ta), $Pb(M_{1/2}N_{1/2})O_3$ (M = Mg, Cd, Mn, Co; N = W, Re) or $Pb(M_{2/3}N_{1/3})O_3$ (M = Mn, Fe; N = W, Re) or mixed phases of these compounds, and $Pb(Zr_xTi_{1-x})O_3$ (PZT, $0.0 \leq x \leq 1.0$), and is oriented in any of the orientations of a cubic crystal (100), tetragonal crystal (001), rhombohedral crystal (100) or quasi-cubic crystal (100).

11. The method for manufacturing a piezoelectric device according to any one of claims 8 through 10, wherein said bottom electrode is formed by a metal material.

12. The method for manufacturing a piezoelectric device according to any one of claims 8 through 10, wherein said bottom electrode is formed by a conductive oxide material with a perovskite crystal structure.

13. The method for manufacturing a piezoelectric device according to any one of claims 8 through 10, wherein said bottom electrode contains any of the compounds M_2RuO_4 (M = Ca, Sr, Ba), RE_2NiO_4 (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y), $REBa_2Cu_3O_x$ (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y), $MRuO_3$ (M = Ca, Sr, Ba), $(RE,M)CrO_3$ (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y; M = Ca, Sr, Ba), $(RE,M)MnO_3$ (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y; M = Ca, Sr, Ba), $(RE,M)CoO_3$ (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y; M = Ca, Sr, Ba), or $RENiO_3$ (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y), or a solid solution containing these compounds, and is oriented in any of the orientations of a cubic crystal (100), tetragonal crystal (001), rhombohedral crystal (100) or quasi-cubic crystal (100).

14. A method for manufacturing a piezoelectric device in which an intermediate film is formed on a substrate using an ion beam assist method at least in part, a bottom electrode is formed on top of said intermediate film, a piezoelectric film is formed on top of said bottom electrode, and a top electrode is formed on top of said piezoelectric film.

15. The method for manufacturing a piezoelectric device according to claim 14, wherein an ion beam assist method is used to form the portion of said intermediate film that is located on the bottom electrode side.

16. The method for manufacturing a piezoelectric device according to claim 14, wherein said intermediate film is formed by forming a first layer of the intermediate film on the substrate by an ion beam assist method, and forming a second layer of the intermediate film on top of said first layer.

17. The method for manufacturing a piezoelectric device according to claim 16, wherein said second layer is formed on top of said first layer of the intermediate film by epitaxial growth.

18. The method for manufacturing a piezoelectric device according to any one of claims 14 through 17, wherein said intermediate film functions as a diaphragm.

19. The method for manufacturing a piezoelectric device according to any one of claims 14 through 17, wherein said intermediate film functions as a buffer layer.

20. The method for manufacturing a piezoelectric device according to any one of claims 14 through 19, wherein said bottom electrode is formed on top of said intermediate film by epitaxial growth, and said piezoelectric film is formed on top of said bottom electrode by epitaxial growth.

21. The method for manufacturing a piezoelectric device according to any one of claims 14 through 20, wherein said piezoelectric film contains a solid solution of PMN_y-PZT_{1-y} consisting of a relaxer material PMN comprising any of the compounds $Pb(M_{1/3}N_{2/3})O_3$ (M = Mg, Zn, Co, Ni, Mn; N = Nb, Ta), $Pb(M_{1/2}N_{1/2})O_3$ (M = Sc, Fe, In, Yb, Ho, Lu; N = Nb, Ta), $Pb(M_{1/2}N_{1/2})O_3$ (M = Mg, Cd, Mn, Co; N = W, Re) or $Pb(M_{2/3}N_{1/3})O_3$ (M = Mn, Fe; N = W, Re) or mixed phases of these compounds, and $Pb(Zr_xTi_{1-x})O_3$ (PZT, $0.0 \leq x \leq 1.0$), and is oriented in any of the orientations of a cubic crystal (100), tetragonal crystal (001), rhombohedral crystal (100) or quasi-cubic crystal (100).

22. The method for manufacturing a piezoelectric device according to any one of claims 14 through 21, wherein said bottom electrode contains any of the compounds M_2RuO_4 (M = Ca,

Sr, Ba), RE_2NiO_4 (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y), $REBa_2Cu_3O_x$ (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y), $MRuO_3$ (M = Ca, Sr, Ba), $(RE,M)CrO_3$ (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y; M = Ca, Sr, Ba), $(RE,M)MnO_3$ (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y; M = Ca, Sr, Ba), $(RE,M)CoO_3$ (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y; M = Ca, Sr, Ba), or $RENiO_3$ (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y), or a solid solution containing these compounds, and is oriented in any of the orientations of a cubic crystal (100), tetragonal crystal (001), rhombohedral crystal (100) or quasi-cubic crystal (100).

23. The method for manufacturing a piezoelectric device according to any one of claims 14 through 22, wherein the portion of said intermediate film that is formed using an ion beam assist method is formed by compounds with a fluorite structure.

24. The method for manufacturing a piezoelectric device according to any one of claims 14 through 22, wherein the portion of said intermediate film that is formed using an ion beam assist method is formed by compounds with an NaCl structure.

25. The method for manufacturing a piezoelectric device according to any one of claims 14 through 22, wherein the portion of said intermediate film that is formed using said ion beam assist method contains a compound with a fluorite structure such as $RE_x(Zr_{1-y}Ce_y)_{1-x}O_{2-0.5x}$ ($0.0 \leq x \leq 1.0$, $0.0 \leq y \leq 1.0$; RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y)or a solid solution of such compounds, or a compound with a pyrochlore structure such as $RE_2(Zr_{1-y}Ce_y)_2O_7$ ($0.0 \leq y \leq 1.0$; RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm,

Yb, Lu, Y) or a solid solution of such compounds, and has a cubic crystal (100) orientation.

26. A method for manufacturing a piezoelectric device comprising the steps of:

forming a bottom electrode on a substrate;

forming a piezoelectric film on top of said bottom electrode; and

forming a top electrode on top of said piezoelectric film;

wherein said step of forming a piezoelectric film comprises the steps of forming a first layer by an ion beam assist method, and forming a second layer by continuing deposition with the ion beam assist stopped.

27. A method for manufacturing a piezoelectric device comprising the steps of:

forming a bottom electrode on a substrate;

forming a piezoelectric film on top of said bottom electrode; and

forming a top electrode on top of said piezoelectric film;

wherein said step of forming a bottom electrode comprises the steps of forming a first layer by an ion beam assist method, and forming a second layer by continuing deposition with the ion beam assist stopped.

28. The method for manufacturing a piezoelectric device according to claim 27, wherein said piezoelectric film is formed on top of said bottom electrode by epitaxial growth.

29. A method for manufacturing a piezoelectric device comprising the steps of:

forming an intermediate film that functions as a buffer layer or a diaphragm on a substrate;

forming a bottom electrode on top of said intermediate film;

forming a piezoelectric film on top of said bottom electrode; and

forming a top electrode on top of said piezoelectric film;

wherein said step of forming an intermediate film comprises the steps of forming a first layer with an in-plane orientation by an ion beam assist method, and forming a second layer by continuing deposition with the ion beam assist stopped.

30. The method for manufacturing a piezoelectric device according to claim 29, wherein said bottom electrode and said piezoelectric film are successively formed on top of said intermediate film by epitaxial growth.

31. The method for manufacturing a piezoelectric device according to any one of claims 26 through 30, wherein a combination of said step of forming a first layer and said step of forming a second layer is repeated a multiple number of times.

32. A method for manufacturing a piezoelectric device comprising the steps of:

forming a bottom electrode on a substrate;

forming a piezoelectric film on top of said bottom electrode; and

forming a top electrode on top of said piezoelectric film;

wherein the surface on which said piezoelectric film is to be formed is irradiated with an ion beam prior to the formation of said piezoelectric film.

33. The method for manufacturing a piezoelectric device according to claim 32, wherein said piezoelectric film is formed by epitaxial growth following said ion beam irradiation.

34. A method for manufacturing a piezoelectric device comprising the steps of:

forming a bottom electrode on a substrate;

forming a piezoelectric film on top of said bottom electrode; and

forming a top electrode on top of said piezoelectric film;

wherein the surface on which said bottom electrode is to be formed is irradiated with an ion beam prior to the formation of said bottom electrode.

35. The method for manufacturing a piezoelectric device according to claim 34, wherein said bottom electrode and said piezoelectric film are successively formed by epitaxial growth following said ion beam irradiation.

36. A method for manufacturing a piezoelectric device comprising the steps of:

forming an intermediate film that functions as a buffer layer or a diaphragm on a substrate;

forming a bottom electrode on top of said intermediate film;

forming a piezoelectric film on top of said bottom electrode; and

forming a top electrode on top of said piezoelectric film;

wherein the surface on which said intermediate film is to be formed is irradiated with an ion beam prior to the formation of said intermediate film.

37. The method for manufacturing a piezoelectric device according to claim 36, wherein said intermediate film, said bottom electrode and said piezoelectric film are successively formed by epitaxial growth following said ion beam irradiation.

38. A method for manufacturing a liquid jetting head comprising the steps of:

forming a piezoelectric device by the manufacturing method according to any of claims 1 through 37; and

forming cavities whose internal volumes are caused to vary according to the deformation of said piezoelectric film of

said piezoelectric device in said substrate of said piezoelectric device.

39. A method for manufacturing a liquid jetting device which uses a liquid jetting head formed by the manufacturing method according to claim 38.

40. A method for manufacturing a ferroelectric device in which a bottom electrode is formed on a substrate, a ferroelectric film is formed on top of said bottom electrode by an ion beam assist method, and a top electrode is formed on top of said ferroelectric film.

41. A method for manufacturing a ferroelectric device comprising the steps of:

forming a bottom electrode on a substrate;

forming a ferroelectric film on top of said bottom electrode by performing a process in which a sol containing the material of the ferroelectric film is applied as a coating, dried and degreased to form a precursor, and [this precursor] is then fired; and

forming a top electrode on top of said ferroelectric film;

wherein said precursor is irradiated with an ion beam at least once following said degreasing in said step of forming said ferroelectric film.

42. The method for manufacturing a ferroelectric device according to claim 40 or claim 41, wherein said ferroelectric film contains a solid solution of PMN_y-PZT_{1-y} consisting of a relaxer material PMN comprising any of the compounds $Pb(M_{1/3}N_{2/3})O_3$ (M = Mg, Zn, Co, Ni, Mn; N = Nb, Ta), $Pb(M_{1/2}N_{1/2})O_3$ (M = Sc, Fe, In, Yb, Ho, Lu; N = Nb, Ta), $Pb(M_{1/2}N_{1/2})O_3$ (M = Mg, Cd, Mn, Co; N = W, Re) or $Pb(M_{2/3}N_{1/3})O_3$ (M = Mn, Fe; N = W, Re) or mixed phases of these compounds, and $Pb(Zr_xTi_{1-x})O_3$ (PZT, $0.0 \leq x \leq 1.0$), and is oriented in any of the orientations of a cubic crystal (100), tetragonal crystal (001), rhombohedral crystal (100) or quasi-cubic crystal (100).

43. A method for manufacturing a ferroelectric device in which a bottom electrode is formed on a substrate by an ion beam assist method, a ferroelectric film is formed on top of said bottom electrode, and a top electrode is formed on top of said ferroelectric film.

44. The method for manufacturing a ferroelectric device according to claim 43, wherein said ferroelectric film contains a solid solution of PMN_y-PZT_{1-y} consisting of a relaxer material PMN comprising any of the compounds $Pb(M_{1/3}N_{2/3})O_3$ (M = Mg, Zn, Co, Ni, Mn; N = Nb, Ta), $Pb(M_{1/2}N_{1/2})O_3$ (M = Sc, Fe, In, Yb, Ho, Lu; N = Nb, Ta), $Pb(M_{1/2}N_{1/2})O_3$ (M = Mg, Cd, Mn, Co; N = W, Re) or $Pb(M_{2/3}N_{1/3})O_3$ (M = Mn, Fe; N = W, Re) or mixed phases of these compounds, and $Pb(Zr_xTi_{1-x})O_3$ (PZT, $0.0 \leq x \leq 1.0$), and is oriented in any of the orientations of a cubic crystal (100), tetragonal crystal (001), rhombohedral crystal (100) or quasi-cubic crystal (100).

45. The method for manufacturing a ferroelectric device according to claim 43 or claim 44, wherein said bottom electrode contains any of the compounds M_2RuO_4 (M = Ca, Sr, Ba), RE_2NiO_4 (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y), $REBa_2Cu_3O_x$ (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y), $MRuO_3$ (M = Ca, Sr, Ba), $(RE,M)CrO_3$ (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y; M = Ca, Sr, Ba), $(RE,M)MnO_3$ (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y; M = Ca, Sr, Ba), $(RE,M)CoO_3$ (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y; M = Ca, Sr, Ba), or $RENiO_3$ (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y), or a solid solution containing these compounds, and is oriented in any of the orientations of a cubic crystal (100), tetragonal crystal (001), rhombohedral crystal (100) or quasi-cubic crystal (100).

46. A method for manufacturing a ferroelectric device in which an intermediate film is formed on a substrate using an

ion beam assist method at least in part, a bottom electrode is formed on top of said intermediate film, a ferroelectric film is formed on top of said bottom electrode, and a top electrode is formed on top of said ferroelectric film.

47. The method for manufacturing a ferroelectric device according to claim 46, wherein an ion beam assist method is used to form the portion of said intermediate film that is located on the bottom electrode side.

48. The method for manufacturing a ferroelectric device according to claim 46, wherein said intermediate film is formed by forming a first layer of the intermediate film on the substrate by an ion beam assist method, and forming a second layer of the intermediate film on top of said first layer.

49. The method for manufacturing a ferroelectric device according to any one of claims 46 through 48, wherein said ferroelectric film contains a solid solution of PMN_y-PZT_{1-y} consisting of a relaxer material PMN comprising any of the compounds $Pb(M_{1/3}N_{2/3})O_3$ (M = Mg, Zn, Co, Ni, Mn; N = Nb, Ta), $Pb(M_{1/2}N_{1/2})O_3$ (M = Sc, Fe, In, Yb, Ho, Lu; N = Nb, Ta), $Pb(M_{1/2}N_{1/2})O_3$ (M = Mg, Cd, Mn, Co; N = W, Re) or $Pb(M_{2/3}N_{1/3})O_3$ (M = Mn, Fe; N = W, Re) or mixed phases of these compounds, and $Pb(Zr_xTi_{1-x})O_3$ (PZT, $0.0 \le x \le 1.0$), and is oriented in any of the orientations of a cubic crystal (100), tetragonal crystal (001), rhombohedral crystal (100) or quasi-cubic crystal (100).

50. The method for manufacturing a ferroelectric device according to any one of claims 46 through 49, wherein said bottom electrode contains any of the compounds M_2RuO_4 (M = Ca, Sr, Ba), RE_2NiO_4 (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y), $REBa_2Cu_3O_x$ (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y), $MRuO_3$ (M = Ca, Sr, Ba), $(RE,M)CrO_3$ (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y; M = Ca, Sr, Ba), $(RE,M)MnO_3$ (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y; M = Ca, Sr, Ba), $(RE,M)CoO_3$ (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy,

Ho, Er, Tm, Yb, Lu, Y; M = Ca, Sr, Ba), or $RENiO_3$ (RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y), or a solid solution containing these compounds, and is oriented in any of the orientations of a cubic crystal (100), tetragonal crystal (001), rhombohedral crystal (100) or quasi-cubic crystal (100).

51. The method for manufacturing a ferroelectric device according to any one of claims 46 through 50, wherein the portion of said intermediate film that is formed using said ion beam assist method contains a compound with a fluorite structure such as $RE_x(Zr_{1-y}Ce_y)_{1-x}O_{2-0.5x}$ ($0.0 \le x \le 1.0$, $0.0 \le y \le 1.0$; RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y) or a solid solution of such compounds, or a compound with a pyrochlore structure such as $RE_2(Zr_{1-y}Ce_y)_2O_7$ ($0.0 \le y \le 1.0$; RE = La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y) or a solid solution of such compounds, and has a cubic crystal (100) orientation.

52. A method for manufacturing a ferroelectric device comprising the steps of:

forming a bottom electrode on a substrate;

forming a ferroelectric film on top of said bottom electrode; and

forming a top electrode on top of said ferroelectric film;

wherein said step of forming a ferroelectric film comprises the steps of forming a first layer with an in-plane orientation by an ion beam assist method, and forming a second layer by continuing deposition with the ion beam assist stopped.

53. A method for manufacturing a ferroelectric device comprising the steps of:

forming a bottom electrode on a substrate;

forming a ferroelectric film on top of said bottom electrode; and

forming a top electrode on top of said ferroelectric film;

wherein said step of forming a bottom electrode comprises the steps of forming a first layer with an in-plane orientation by an ion beam assist method, and forming a second layer by continuing deposition with the ion beam assist stopped.

54. A method for manufacturing a ferroelectric device comprising the steps of:

forming an intermediate film that functions as a buffer layer on a substrate;

forming a bottom electrode on top of said intermediate film;

forming a ferroelectric film on top of said bottom electrode; and

forming a top electrode on top of said ferroelectric film;

wherein said step of forming an intermediate film comprises the steps of forming a first layer with an in-plane orientation by an ion beam assist method, and forming a second layer by continuing deposition with the ion beam assist stopped.

55. A method for manufacturing a ferroelectric device comprising the steps of:

forming a bottom electrode on a substrate;

forming a ferroelectric film on top of said bottom electrode; and

forming a top electrode on top of said ferroelectric film;

wherein the surface on which said ferroelectric film is to be formed is irradiated with an ion beam prior to the formation of said ferroelectric film.

56. A method for manufacturing a ferroelectric device comprising the steps of:

forming a bottom electrode on a substrate;

forming a ferroelectric film on top of said bottom electrode; and

forming a top electrode on top of said ferroelectric film;

wherein the surface on which said bottom electrode is to be formed is irradiated with an ion beam prior to the formation of said bottom electrode.

57. A method for manufacturing a ferroelectric device comprising the steps of:

forming an intermediate film that functions as a buffer layer on a substrate;

forming a bottom electrode on top of said intermediate film;

forming a ferroelectric film on top of said bottom electrode; and

forming a top electrode on top of said ferroelectric film;

wherein the surface on which said intermediate film is to be formed is irradiated with an ion beam prior to the formation of said intermediate film.

58. A method for manufacturing a ferroelectric memory comprising the steps of:

forming a ferroelectric device by the manufacturing method according to any one of claims 40 through 57; and

electrically connecting a driving circuit that selectively applies a signal voltage to said ferroelectric device.

59. A method for manufacturing an electronic device wherein a ferroelectric device formed by the manufacturing method according to any one of claims 40 through 57 is used.

60. A piezoelectric device which is formed by forming a bottom electrode, piezoelectric film and top electrode on a substrate, wherein said piezoelectric film is a film with an

in-plane orientation which is formed by an ion beam assist method.

61. A piezoelectric device which is formed by forming a bottom electrode, piezoelectric film and top electrode on a substrate, wherein said bottom electrode is a film with an in-plane orientation which is formed by an ion beam assist method.

62. A piezoelectric device which is formed by forming an intermediate film, bottom electrode, piezoelectric film and top electrode on a substrate, wherein at least a portion of said intermediate film is a film with an in-plane orientation which is formed by an ion beam assist method.

63. The piezoelectric device according to claim 62, wherein the portion of said intermediate film that is located on the bottom electrode side is a film with an in-plane orientation which is formed by an ion beam assist method.

64. A piezoelectric device which is formed by forming an intermediate film, bottom electrode, piezoelectric film and top electrode on a substrate, wherein said intermediate film includes a first layer with an in-plane orientation which is formed by an ion beam assist method, and a second layer which is formed on top of said first layer.

65. A piezoelectric device which is formed by forming a bottom electrode, piezoelectric film and top electrode on a substrate, wherein said piezoelectric film comprises a first layer with an in-plane orientation which is formed by an ion beam assist method, and a second layer which is formed by continuing deposition with the ion beam assist stopped.

66. A piezoelectric device which is formed by forming a bottom electrode, piezoelectric film and top electrode on a substrate, wherein said bottom electrode comprises a first layer with an in-plane orientation which is formed by an ion beam assist method, and a second layer which is formed by continuing deposition with the ion beam assist stopped.

67. A piezoelectric device which is formed by forming an intermediate film that functions as a buffer layer or diaphragm, a bottom electrode, a piezoelectric film and a top electrode on a substrate, wherein said intermediate film comprises a first layer with an in-plane orientation which is formed by an ion beam assist method, and a second layer which is formed by continuing deposition with the ion beam assist stopped.

68. A piezoelectric device which is formed by forming a bottom electrode, piezoelectric film and top electrode on a substrate, wherein the surface on which said bottom electrode or said piezoelectric film is to be formed is oriented in an in-plane orientation by irradiation with an ion beam.

69. A piezoelectric device which is formed by forming an intermediate film that functions as a buffer layer or diaphragm, a bottom electrode, a piezoelectric film and a top electrode on a substrate, wherein the surface on which said intermediate film is to be formed is oriented in an in-plane orientation by irradiation with an ion beam.

70. A liquid jetting head comprising the piezoelectric device according to any one of claims 60 through 69, wherein cavities whose internal volumes are caused to vary according to the deformation of said piezoelectric film are formed in said substrate.

71. A liquid jetting device comprising the liquid jetting head according to claim 70.

72. A ferroelectric device which is formed by forming a bottom electrode, ferroelectric film and top electrode on a substrate, wherein said ferroelectric film is a film with an in-plane orientation which is formed by an ion beam assist method.

73. A ferroelectric device which is formed by forming a bottom electrode, ferroelectric film and top electrode on a substrate, wherein said bottom electrode is a film with an in-plane orientation which is formed by an ion beam assist method.

74. A ferroelectric device which is formed by forming an intermediate layer, bottom electrode, ferroelectric film and top electrode on a substrate, wherein at least a portion of said intermediate film is a film with an in-plane orientation which is formed by an ion beam assist method.

75. The ferroelectric device according to claim 74, wherein the portion of said intermediate film that is located on the bottom electrode side is a film with an in-plane orientation which is formed by an ion beam assist method.

76. A ferroelectric device which is formed by forming an intermediate film, bottom electrode, ferroelectric film and top electrode on a substrate, wherein said intermediate film includes a first layer with an in-plane orientation which is formed by an ion beam assist method, and a second layer which is formed on top of said first layer.

77. A ferroelectric device which is formed by forming a bottom electrode, ferroelectric film and top electrode on a substrate, wherein said ferroelectric film comprises a first layer with an in-plane orientation which is formed by an ion beam assist method, and a second layer which is formed by continuing deposition with the ion beam assist stopped.

78. A ferroelectric device which is formed by forming a bottom electrode, ferroelectric film and top electrode on a substrate, wherein said bottom electrode comprises a first layer with an in-plane orientation which is formed by an ion beam assist method, and a second layer which is formed by continuing deposition with the ion beam assist stopped.

79. A ferroelectric device which is formed by forming an intermediate film that functions as a buffer layer, a bottom electrode, a ferroelectric film and a top electrode on a substrate, wherein said intermediate film comprises a first layer with an in-plane orientation which is formed by an ion beam assist method, and a second layer which is formed by continuing deposition with the ion beam assist stopped.

80. A ferroelectric device which is formed by forming a bottom electrode, ferroelectric film and top electrode on a substrate, wherein the surface on which said bottom electrode or said ferroelectric film is to be formed is oriented in an in-plane orientation by irradiation with an ion beam.

81. A ferroelectric device which is formed by forming an intermediate film that functions as a buffer layer, a bottom electrode, a ferroelectric film and a top electrode on a substrate, wherein the surface on which said intermediate film is to be formed is oriented in an in-plane orientation by irradiation with an ion beam.

82. A ferroelectric memory comprising:

the ferroelectric device according to any one of claims 72 through 81; and

a driving circuit which is electrically connected to said ferroelectric device, and which selectively applies a signal voltage.

83. An electronic device comprising the ferroelectric device according to any one of claims 72 through 81.